Chapter-VIII

CONCLUSIONS

Based on detailed studies carried out in this thesis, the following important conclusions are drawn:

The efficiency of refining of graphite through froth flotation process using pine oil as frother, linoleic acid as collector, sodium silicate as depressor and sodium carbonate as pH controller has been assessed. This combination is excellent and efficient for any mixture of graphite ores drawn from different locations to refine into commercial grade as well as increasing the fixed carbon content of the graphite ores. This combination of materials for froth flotation process to recover all grades of graphite ores individually or collectively and for different grain sizes can be used for the refining of graphite. The processed graphite ores through repeated flotations were leached using mixture of Hf and Aquaregia improved the quality upto 99\% fixed carbon grade.

Refining of the graphite ore with higher fixed carbon content was effectively processed by froth flotation using potassium ethyl xanthate as collector, pine oil as frother, sodium silicate as depressor and sodium carbonate as pH controller as processing material yielded 98\% of recovery. 66.2\% WO3 concentrated tungsten ore minerals were recovered a marketable grade from the graphite deposits of geographical region –III (East Godavari) as by product. While there is a qualitative relationship between improvement in graphite grade and the gangue material removed by flotation, the some could not be related quantitatively as other factors such
as morphology, and the mineralogy of associated minerals in the graphite ore also can effect the improvement of graphite grade.

As per chemical, analytical data of the samples it is observed that the associated mineral concentration is directly proportional to concentration of graphite. Higher number of associated minerals, high resources of graphite availability in youngest archean formations in medium to coarse grained nature texture with high tectonic activity. Lower numbers of associated minerals, low sources graphite availability in oldest formation in low medium grained texture with low tectonic activity at high altitudes and at places of plain areas has been observed.

The study area can be broadly divided into two categories of regions. Lower graphite resources available areas are showing high altitude, oldest Archean formation, fine to medium grained texture. High graphite resources available areas are showing low altitude, youngest archean formation, coarse grained texture.

Trace element association with graphite availability shows special way to identify the concentration of carbon content with high grade material. Low carbon group of minerals along the eastern ghats from east to western boundary of the study area. The youngest khondallite suite of rocks shows, medium to high grade carbon availability. The gangue material soon after recovery of carbon content is very useful and the disposal pattern of the gangue can also be eco friendly with out any environmental impact in the area. Index trace elements are categorized in to three types as per the association with carbon content.

First category includes low grade carbon in oldest rock formation is indicated by index trace elements Ba & Ni, Low grade carbon content in
youngest rock formation indicated by Ba, V & Cr as associated index trace elements. Second category includes medium grade oldest rock formation is indicated by Ba & Zinc as associated index trace elements. Third category includes higher grade carbon content in oldest rock formation indicated by Ba, V, Cr & Cu as associated index trace elements, and high grade carbon content in youngest rock formation is indicated by Ba, As & W as associated index trace elements.

As a whole the study area indicates Ba as Zonal trace element is the common indicator of Carbon grade content based on its quantity of availability, it means each range of zonal trace element like barium indicates various grades, age, & quantity of carbon content in the study area. Based on the barium trace element association of carbon grade is divided into four classifications.

1. Classification one indicates all grades in all age group of rock formations in the study area based on the zonal trace element availability.
2. Classification two indicates medium grade in youngest rocks based on the zonal trace element availability.
3. Classification three indicates all grades in all age group of rock formations in the study area based on medium concentration of the zonal trace element availability.
4. Classification four indicates high grade in youngest group rock formation in the study area based on high concentration of the zonal trace element availability.